SYSTEM FOR THE DEBITING, COLLECTION AND DISTRIBUTION OF PARKING FEES

Abstract of WO9910844

A cellular system for mobile telecommunication comprising mobile phones that, within their present cells, can receive general messages broadcast by the system and send their own messages to the system and that said general messages contain information about the cell identity and parking fees within different coded parking areas in this cell and in all adjacent cells and that said mobile phones are equipped with a certain parking program by which said general messages can be achieved and the parking tariff, within the actual parking area, can be presented and selected and the cell identity presented and the vehicle registration number stored and the parking started and stopped whereas all this information together with pre-stored information about the subscriber can be sent as own messages by the mobile phone to the system for registration together with starting time and stopping time and further determination of resulting parking fee.

SYSTEM FOR THE DEBITING, COLLECTION AND DISTRIBUTION OF PARKING FEES

Description of **WO9910844**

TITLE
System for the Debiting, Collection and Distribution of Parking Fees
FIELD OF THE INVENTION
The present invention relates to a system for the debiting, collection and distribution of parking fees according to the introduction in claim 1.

BACKGROUND OF THE INVENTION
Parking fees can nowadays be paid to a high extent at electronic credit card parking machines simplifying both payment and collection of these fees. For the one who parks the uncomfortness of walking up to and back from the parking machine, to pay the parking fee, still remain. Since the cost of these parking machines limit their numbers the walking distance can be relatively long and a cue can also appear at the machine. Special electronic parking units are now also available for use in certain cities. Such a unit can be carried along in the vehicle and is here used as a parking meter together with a cash-card. However the number of parking operators are limited and some units only works with one operator. The operator has also now control of the unit functionality. The International Patent Application WO 9627170, WO 9611453 and WO 9320539, all describe how parking fees can be debited through some mobile telephone network. For instance the mobile phone system GSM (Global System for Mobile Communication) could be used from the vehicle to inform a centre about the actual parking zone, when the parking starts and when it stops, together with the user and the vehicle identity. The drawback with this arrangement is that all parking zones will require unique codes, shown on some post sign within the parking area.

These codes will therefore be quite extensive and similar to postcodes if the system should cover a nation. The codes will then be hard to read from distance and the error probability will be high. Such a system will also be impossible for street parking.

The Swedish Patent Application 9700408-9 describes a GSM based system for the debiting of parking fees using a special vehicle installed mobile unit.

Through Cell Broadcast the parking tariff in each GSM cell will be sent to the vehicle installed mobile unit which will calculate the parking fee in the actual cell. One important drawback with this system is that it will require a special mobile unit that has to remain in the vehicle during parking, which is not the case with the normal mobile phone. This arrangement will also allow only one tariff and one tariff owner within one cell area. This is a drawback for street parking when one wants to differentiate tariffs between neighbour streets and for neighbour car parks with different tariff owners.

Consequently there is a need for a general system for efficient debiting, collection and distribution of parking fees using normal GSM mobile phones, within the international coverage of the GSM networks, and allowing several different parking tariffs and tariff owners within the same cell area.

SUMMARY OF THE INVENTION
The object mentioned will be obtained by a system according to the present Invention, which characteristics is made clear by the subsequent claim 1.

A system for parking fees may use GSM phones with a proactive SIM (Subscriber Identity Module) housing a special application program for parking, that communicatedirectiy with both the mobile network and the mobile phone. Through Cell Broadcast the SIM will be informed about present parking tariffs within respectively GSM cell and by using the mobile phone the user may select suitable tariff and start and stop the parking.

Then the SIM can inform a parking centre that calculates parking fee and debit the user while credit the tariff owner. Also parking check may be performed in the parking centre.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS
In the following the invention shall be described.

New GSM phones will be equipped with a proactive SIM. Such cards can communicate directly with both the mobile network and the mobile phone. in which it also may control different procedures. Through the mobile network it is then possible to store both data and program applications in such a SIM.

One application could be a parking program housed in the regular mobile phone menu. This program can instruct the SIM to listen for Cell Broadcast messages on a certain channel, containing cell identity and actual cell parking tariffs. The program could also instruct the SIM on user command to send certain SMS messages (Short Message Service) to some specific parking centre.

Each cell may preferably have two groups of parking tariffs. One for street parking and one for car parks. Within each group the tariffs may be differentiated by a code shown on a post sign in the parking area. For street parking, which normally only have one tariff owner, the code may be a number between 1-9 indicating the tariff level. Such schemes could be used to stimulate the parking distribution to neighbour streets. For car parks the code could be a single character that will be unique for a certain car park, or tariff owner, in the cell area. Different car parks may use the same code for car parks in nonadjacent cells and the alphabet will be quite sufficient.

Especially since the GSM cells are relatively small in city areas.

Through Cell Broadcast the SIM receives parking area codes with valid parking tariffs in the corresponding cell cluster. Since the cells are overlapping the cluster includes the actual cell and all adjacent cells. The SIM will also receive the actual cell identity code for further debiting and parking check.

Using the mobile phone keyboard and text display one may communicate with the SIM to select suitable tariff, start and stop the parking, state and select the vehicle registration number, state maximum parking time and parking fee limits, and receive information about the cell area number. These functions could be contained in a submenu called Parking, below the mobile phone program menu, with other menus for further selection of start and stop, street parking, car park, vehicle number, time out and cell area number. These menus will then have the following meaning:
Start/Stop: Select to start or stop the parking. If the parking has started the
ongoing time is showed.

Street: Scroll and select the number code with parking tariff for the
street parking area
Car park: Scroll and select the character code with parking tariff for the
car park area
Vehicle no: State the Vehicle registration number used and scroll and
select any of these numbers
Time out: State maximum limit for parking time and parking fee
Cell area: Show cell area number
When parking one should first select the menu Parking and from this menu one select Street or Car park. Then one should scroll and select the suitable code and tariff for the parking area. The parking tariffs are showed with the same time base for easy comparing, for instance parking fee per hour. When one has decided and selected parking code and tariff then one starts the parking. Vehicle registration number and time out setting are changed more seldom.

When the parking starts the SIM sends a start message (SMS) to the parking centre with information about subscriber, vehicle number, cell area number, parking area code and tariff and the time out limits. This information together with the starting time is registered in the parking centre. When the parking stops the SIM sends a similar stop message and the resulting parking fee is calculated in the parking centre. If any of the time out limits is passed the parking will stop automatically. Eventually the parking centre may send a receipt when receiving start and stop messages
The parking tariffs may be varied over time and the resulting parking fee may also be limited to a fixed amount after a certain time. All this will be automatically handled in the parking centre and the lowest possible fee is thereby guaranteed. The mobile phone could then also be brought when leaving the car. Once parking has been started for one vehicle the mobile phone could be used for starting a new one with another vehicle number.

When performing parking check the parking centre database is available for authorised parking attendants. Using Internet the parking attendant may read the vehicle numbers for all registered parking within a certain parking area and hereby decide if respectively vehicle has started the parking.

Preferably should all the vehicles using the system be fitted with a visible symbol to be recognised by the parking attendant during checking. The parking attendant will use a hand computer with an Internet browser combined with a mobile phone for Internet access. Using the mobile phone the cell area number will be received and used together with the actual parking area code to retrieve information about vehicle registration numbers in the parking area.

The parking centre should have direct Internet connection to all GSM networks that are offering the parking service. This will allow the parking centre to serve all local GSM operators and tariff owners in the world.

Debited parking fees are preferably paid to the GSM operator over the telephone bill and the parking centre will then work as a clearing centre between GSM operators and tariff owners. Over Internet the parking centre could supply the different actors with the following information:
GSM operator: For each subscriber and vehicle, a subscriber code
together with the monthly accumulated parking fee
Tariff owner: For each GSM operator and parking area, given by the
cell area number and the parking area code, the monthly
accumulated parking fee
Subscriber: For the subscriber code, shown on the telephone bill, all
registered parking with that vehicle in terms of parking
area and parking time
The parking centre will also use the Internet connection to the actual GSM network when sending Cell Broadcast to each cell area. Tariff schemes for each parking area, showing amount and time depence, will be supplied and updated over Internet by each tariff owner.

The Invention is not limited to the above mentioned performance but can be varied within the scope of the subsequent claims.

SYSTEM FOR THE DEBITING, COLLECTION AND DISTRIBUTION OF PARKING FEES

Claims of **WO9910844**

CLAIMS:

1. A cellular system for mobile telecommunication comprising mobile phones that, within their present cells, can receive general messages broadcast by the system and send their own messages to the system, c h a r a c t e r i s e d i n, that said general messages contain information about the cell identity and parking fees within different coded parking areas in this cell and in all adjacent cells and that said mobile phones are equipped with a certain parking program by which said general messages can be received and the parking tariff, within the actual parking area, can be presented and selected and the cell identity presented and the vehicle registration number stored and the parking started and stopped whereas all these information together with pre-stored information about the subscriber can be sent as own messages by the mobile phone to the system for registration together with starting time and stopping time and further determination of resulting parking fee.

2. A system according to claim 1, c h a r a c t e r i s e d i n, that this is of type GSM (Global System for Mobile Communication) and that a parking centre, connected to said system, broadcast said general messages and receives said own messages from the mobile phones for registration and determination of parking fees that are debited corresponding subscribers and credited those who are entitled to the parking fee within respectively parking area.

3. A system according to claim 2, c h a r a c t e r i s e d i n, that said general messages are transmitted through Cell Broadcast on a channel which number is stored on the SIM (Subscriber Identity Module) in the mobile phone and that these messages contain information about tariffs with related codes for all parking areas within a cell area, made up by the actual cell and all adjacent cells, and this cell area number and that these codes are made up by numbers for street parking and characters for car parks.

4. A system according to claim 2-3, c h a r a c t e r i s e d i n, that said own messages from the mobile phones are transmitted as SMS to a teleadress that is stored on the SIM in the mobile phone and that these messages contain information about subscriber, vehicle registration number, cell area number, parking area code and eventual limits in parking time and parking fee.

5.A system according to claim 2-4, c h a r a c t e r i s e d i n, that the SIM in the mobile phones also contain said parking program and that this is a part of the mobile phone program menu operated through the mobile phone keyboard and text display and that said data and parking program can be tranferred to the SIM through the GSM network.

6. A system according to claim 2-5, c h a r a c t e r i s e d i n, that said parking centre on request can present registration numbers for all vehicles with ongoing parkings being registered, through one of the GSM networks connected to the parking centre, within a certain parking area given by the cell area number, in one of these GSM networks, and the parking area code.

7. A system according to claim 2-6, c h a r a c t e r i s e d i n, that said parking centre on request can present the accumulated parking fee, for a certain GSM network connected to the parking centre, within a certain parking area given by the cell area number, in this GSM network, and the parking area code.

8. A system according to claim 2-7, c h a r a c t e r i s e d i n, that said parking centre on request can present parking area, parking time and parking fee regarding all registred parking for a vehicle with a certain registration number related to a certain subscriber belonging to a certain GSM network connected to the parking centre.

9. A system according to claim 6-8, c h a r a c t e r i s e d i n, that said parking centre is also connected to Intenet why said requests and presentations can be transferred through this communication system.

10. A system according to claim 2-9, c h a r a c t e r i s e d i n, that systems of type GSM also comprise

systems of type DCS 1800 (Digital
Cellular System - 1800 MHz) or systems of type PCS 1900 (Personal
CommunicationServices - 1900 MHz).

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 98/01464

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: G07C 1/30, G07F 17/24

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: G07C, G07F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 9719568 A1 (VAZAN, BEHRUZ), 29 May 1997 (29.05.97)	1-10
A	WO 9627170 A1 (PARKIT OY), 6 Sept 1996 (06.09.96)	1-10
A	WO 9611453 A1 (PARKIT OY), 18 April 1996 (18.04.96)	1-10
A	WO 9320539 A1 (JONSSON, TOMMY), 14 October 1993 (14.10.93)	1-10

☐ Further documents are listed in the continuation of Box C.   ☒ See patent family annex.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	
"E" earlier document but published on or after the international filing date	"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	
	"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
17 Sept 1998	**25 -09- 1998**
Name and mailing address of the ISA/ **Swedish Patent Office** Box 5055, S-102 42 STOCKHOLM Facsimile No. + 46 8 666 02 86	Authorized officer **Per-Olof Warnbo** Telephone No. + 46 8 782 25 00

Patent document cited in search report			Publication date	Patent family member(s)			Publication date
WO	9719568	A1	29/05/97	FI	970767	A	20/10/97
WO	9627170	A1	06/09/96	AU	4721396	A	18/09/96
				EP	0812448	A	17/12/97
				FI	950918	A	29/08/96
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				FI	944738	A	08/04/96
WO	9320539	A1	14/10/93	AU	3911993	A	08/11/93
				DE	69316888	D	00/00/00
				EP	0634039	A,B	18/01/95
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				SE	506681	C	26/01/98
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